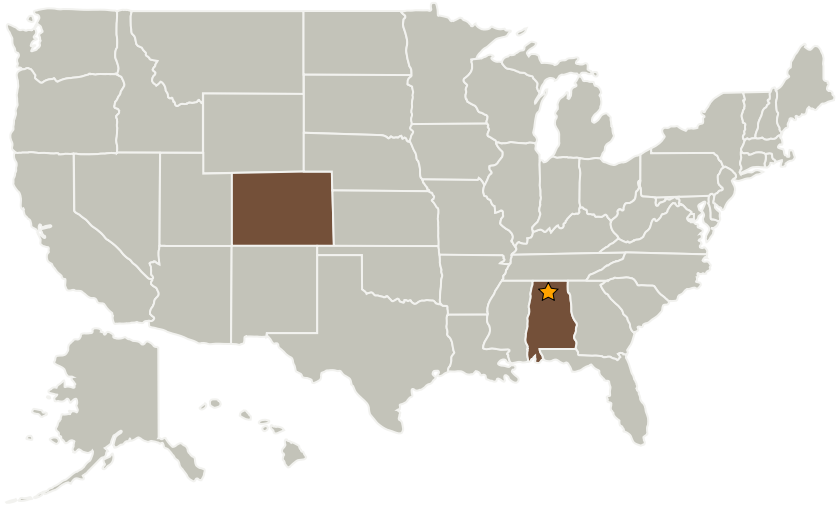
In-Situ Resources Utilization for Organic Chemicals Production, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

This proposed Small Business Innovative Research Phase I addresses the development of a catalytic system for efficient conversion of carbon dioxide and hydrogen to hydrocarbon and organic species via carbon monoxide. This approach is particularly relevant to future Mars missions, since the Martian atmosphere is comprised of over 95% CO2. The proposed approach will utilize Fischer-Tropsch Synthesis (FTS) chemistry to selectively convert CO produced by CO2 reduction, e.g., from reverse water gas shift (RWGS), into hydrocarbons and oxygenates for many applications. The proposed approach is complementary to previous effort by Eltron in which nanoscale catalysts were developed for promoting RWGS. The proposed approach meshes ideally with RWGS in that stoichiometric mixtures of carbon dioxide and hydrogen lead to an H2:CO ratio of approximately 1.5 at the RWGS exit. Phase I will consist of the preparation, characterization, and evaluation of 12-15 candidate catalysts anticipated to have exceptional activity for selective (essentially CO2 free) FTS. Downselection of catalysts and identification of preferred conditions will result during Phase I. Phase II will involve the fabrication and testing of a closed loop system for converting CO2 and hydrogen into fuels, chemicals, plastics, etc.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Eltron Research & Development, Inc.	Supporting Organization	Industry	Boulder, Colorado

Primary U.S. Work Locations	
Alabama	Colorado

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

James White

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization